Original Article

Reliability and Validity of the Turkish Version of the Moral Development Scale for Professionals

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Abstract

Background: Moral development is an important element for professionals to achieve their objectives and targets. A scale that measures the moral development levels of professionals has not been encountered in Turkey.
Aim: The present study was intended to adapt to Turkish the Moral Development Scale for Professionals and to access its reliability and validity.
Methodology: The scale was adapted to Turkish and its linguistic and content validity was assessed in this study. Moreover, the reliability of the scale was accessed by Test-Retest; the internal consistency was checked by Cronbach α, while exploratory factor analysis and confirmatory factor analysis were also conducted.
Results: The factor analysis applied showed that the eigenvalue of the two factors were 4.112 and 1.140 respectively. The variance percentages of the factors were 34.267% and 9.496%, respectively. The total variance explained by the factors was found to be 43.764%.
Conclusions: The translated in Turkish Moral Development Scale's properties found to be very satisfactory indicating that the scale is a reliable and valid instrument for assessing moral development in professionals.

Key words: moral development, scale, profession.

Introduction

Moral development is a process aiming an individual's adaptation to the environment in which he/she lives by adopting the value judgments of the society and formation of his/her own principles and value judgments. It is the demonstration by the individual from early ages the right behaviors liked and accepted by the society (Cirak 2003).

Moral development in nurses is a very important aspect for nurses to achieve their objectives and targets, to carry out nursing practices with minimum error and in an orderly and ethical way as far as possible, and to meet both individual and social needs in an efficient and sustainable way. The one who serves and the one who is served being humans particularly in the healthcare sector, nurses' assuming the responsibility of patients in decision making and action taking all by themselves and their professional attitude in this sector make moral development more urgent and significant (Tanriverdi, Adiguzel, Ozkan 2011). It is possible to associate moral development with the self-realization levels of individuals. The individuals whose moral development is at an upper level can be assumed to be at higher stages also in self-realization. The characteristics of self-realized persons including feeling of freedom, ability to assume responsibilities, ability to be problem-focused, thinking/acting in line with personal principles and ideals, making decisions using rational methods, engaging in interpersonal relationships and critical thinking can also be attributed to the individuals who arrived at the last stages of moral development. The care given by the nurses who have these

characteristics will undoubtedly be of higher quality.

In the studies made in Turkey, the moral development levels have been explored in children and in the students of primary school, high school and university (Kabadayi, Aladag 2010, Ozgulec 2001, Tola 2003).

It can be said that all health professionals and nurses in our country experience moral and ethical problems. However, despite such problems, the concept of "moral development" has not been dealt with yet for professionals in the "Turkish Literature".

A scale that measures the moral development levels of professionals (nurses in particular) has not been encountered in Turkey. MDSP, which will be introduced to Turkish literature, will enable assessment of the moral development levels of professionals and can be used as input in planning of interventions for revealing the reasons of the deficiencies arising from ethical and moral problems in healthcare. The course to be followed when making this assessment should naturally be evidence-based and scientific. For this reason, utilization of a model/theory is extremely important (Ipek Coban, Turer 2014).

Methods

Participants

The study population included all the nurses working at an University Hospital. The study sample consisted of 120 nurses selected according to a power analysis at 0.5 influence quantity and within 95% confidence interval determined by a 0.05 α level. It is also recommended in the literature that people as many as 10 times the number of items available in the scale should be contacted when deciding on the sample size in a validity and reliability study (Akgul 2005, Gozum, Aksayan 2003).

Instrument

Moral Development Scale for Professionals

The Moral Development Scale for Professionals was developed by Skisland et al. (2011) in Norway. The scale consists of 3 factors. The factor names are same as the Kohlberg's moral development levels and they include the following items:

1. Factor 1: Pre-conventional level: 6, 10
2. Factor 2: Conventional level: 1, 3, 5, 7

3. Factor 3: Post-conventional level: 2, 4, 8, 9, 11, 12

The scale consists of 12 items. It is a Likert-type scale. The items are given numeric values between 1 and 5 (1 not agree at all, 2 not agree in part, 3 indecisive, 4 agree in part and 5 agree completely). A total score between 12 and 60 is obtained at the end of the scale. Higher scores indicate higher levels of moral development. The outcomes are interpreted as being at the pre-conventional level if the score is between 12 and 27, at the conventional level if the score is between 28 and 44 and at the post-conventional level if the score is between 45 and 60 (Gozum, Aksayan, 2003; Gibbs et al. 2007).

Procedure

Validity and Reliability of the Turkish Version of the Moral Development Scale for Professionals

The validity and reliability of the Turkish Version of the Moral Development Scale for Professionals has been conducted in line with the opinions of the persons specialized in this subject.

Linguistic Validity of the Moral Development Scale for Professionals

At this stage of the study, an expert opinion was sought for the linguistic validity of the scale, the necessary arrangements were made in line with the opinion obtained and the scale was adapted to Turkish.

Content Validity

Validity is a concept relating to the extent to which a person's characteristic that is being measured is measured accurately. Content validity is an indicator of whether the items comprising a test are adequate in quantity and quality for measuring the behavior that is being measured and one of the frequently used methods to test content validity is to resort to expert opinion (Tavsancil 2002).

Test-Retest Reliability

In the study, 120 nurses were included in the initial administration of the scale. A test-retest was conducted on all the nurses. When adapting a scale to another culture, 5-10 times the number of scale items should be reached. We managed to reach 10 times the number of scale items (12x10=120) in the test-retest reliability of

MDSP. When administering the scale, we observed that answering the forms took about 3-5 minutes. After the initial administration, appointments were made for test-retest and retest was conducted 15 days later. By comparing the initial results with those obtained 15 days later using the Pearson product-moment correlation technique, the scale was evidenced not to change in time.

Internal Consistency

The item-total correlations and Cronbach α reliability coefficient were used to test the scale for internal consistency. The item-total correlation shows whether each of the items in the scale is eligible for inclusion in the scale. The Cronbach α reliability coefficient is an indicator of the internal consistency and homogeneity of the items in the scale. The higher the Cronbach α reliability coefficient of the scale, the more consistent are the items in the scale with each other and the more they consist of items that test the components of the same characteristic. In a Likert-type scale, a reliability coefficient that can be considered adequate should be as close to 1 as possible.

Exploratory Factor Analysis (EFA)

A factor analysis was carried out to reveal the factor structure of MDSP. The number of factors was found using scree plot, component matrix, common factor variance, rate of variance explained, representation of the hypothetical structure and Kaiser criterion ($\geq$ 1 eigenvalue) (Conway and Juffcutt, 2003; Tabachnick and Fidell, 2007; Mahmoud and Kamel, 2010; Brayman and Cramer, 2011).

Confirmatory Factor Analysis (CFA)

The 2-factor structure resulted from EFA was tested for appropriateness. To that end, we looked at the test results of the measurement model where the correlations between the observed and latent variables in the research model were tested via confirmatory factor analysis (Mueller, Hancock, 2001).

Ethical Concerns

Permission was obtained from the author for adapting to Turkish the Moral Development Scale for Professionals, which was first developed by Skisland et al. The necessary permission was obtained from the relevant institution to carry out the study. Moreover, the thesis proposal was presented to the Ethics Committee of an Health Sciences Faculty and an Ethics Committee approval was obtained for the study. The purpose of the study and the things they should do were explained to the individuals who intended to take part in the study and the informed consent requirement was fulfilled as an ethical principle. Since the responses had to be given voluntarily, care was taken that the nurses to be included in the study were willing and their verbal consents were obtained after telling them that they were free to participate in the study or not.

Results

Content Validity

In the study to test the linguistic and content validity of the Moral Development Scale for Professionals, first the scale was translated from English to Turkish by the investigator and a different linguist who had good command of the two languages. The English and Turkish versions of the scale were reviewed by 11 experts. The experts rated each expression in the scale with 1 point as "not appropriate", with 2 points as "a little appropriate, the item should be made appropriate", with 3 points as "can be appropriate" and with 4 points as "very appropriate". At the end of the evaluation, some modifications were made in the expressions that were not appropriate in line with the suggestions of the experts. When the scale was back translated later from Turkish to English by a different linguist who had a good command of both languages, it was seen that there were no meaning changes in the scale's expressions. The expert opinions were adapted to the Lawshe technique and grouped under 3 assessments. The options "a little appropriate" and "can be appropriate" were arranged in a way so that they could be retained. These were considered as positive assessments. The "Kaiser-Meyer-Olkin" test was used to find the adequacy of the sample. Furthermore, the "Barlett's Test of Sphericity" analysis was run to find whether or not the scale is suitable for a factor analysis. The sample adequacy of the Moral Development Scale for Professionals was found to be 0.846 as calculated by Kaiser-Meyer-Olkin. The result of the Barlett Test turned out to be 449.191 (Table 1). Since p<0.001 according to the both analyses, it was seen that it had normal distribution.

Table 1. Kaiser-Meyer-Olkin and Barlett Test Results

Kaiser-Meyer-Olkin	0.846
Barlett's Test	X^2=449.191

Table 2. Factor Structure, Eigenvalues and Variances Explained of Moral Development Scale for Professionals

Factors	Moral Development Scale for Professionals	Factor loadings
	8. It makes sense to listen to what most people think is right or wrong.	**0.714**
	6. The most important values of a community are thoughtfulness and kindness.	**0.680**
	3. Correct behavior consists largely of performing one's social imposed obligations	**0.591**
Factor 1	**7.** Respect for authority is valuable in themselves.	**0.588**
	12. For a moral rule to be good, it should be possible to place it into a larger context.	**0.585**
	9. For a value to be good it must apply to all people.	**0.563**
	1. Living by the family, a group or a nation's expectations is a value in itself.	**0.544**
	10. What determines whether an act is right, is that the idea in itself is good.	**0.530**
Factor 2	**11.** It will usually be possible to have a discussion to reach a common agreement in moral issues	**0.819**
	5. When an action is considered immoral, it is because it is a violation of established laws and rules that everyone should feel obligated to.	**0.635**
	2. It is important to listen to public opinion in moral questions.	**0.630**
	4. The majority rarely makes wrong.	**0.482**

	Percentiles of variances	Eigen values
Factor 1	34.267	4.112
Factor 2	9.496	1.140
Cumulative percentiles % 43.764		

Table 3. Reliability Statistics for the Whole Scale and its Subscales

Factors	Items	Cronbach α values
Descriptive Dimension	Item 1 Item 3 Item 6 Item 7 Item 8 Item 9 Item 10 Item 12	0.793
Nominative Dimension	Item 2 Item 4 Item 5 Item 11	0.619
MDSP	**TOTAL**	**0.821**

Table 4. Results of Item Correlation Analysis

	Item-Total Correlations		Cronbach α value if item deleted
Items	**R**	**P**	**A**
Item 1	0.564	0.000	0.808
Item 2	0.583	0.000	0.807
Item 3	0.644	0.000	0.803
Item 4	0.470	0.000	0.818
Item 5	0.559	0.000	0.810
Item 6	0.558	0.000	0.809
Item 7	0.550	0.000	0.812
Item 8	0.630	0.000	0.803
Item 9	0.584	0.000	0.809
Item 10	0.622	0.000	0.803
Item 11	0.507	0.000	0.814
Item 12	0.705	0.000	0.795

Table 5. Correlation Analysis of the Test-Retest Scores of MDSP

Item no	Correlation value
Item 1	0.784
Item 2	0.640
Item 3	0.800
Item 4	0.673
Item 5	0.634
Item 6	0.742
Item 7	0.803
Item 8	0.702
Item 9	0.685
Item 10	0.619
Item 11	0.639
Item 12	0.691
Total Point	0.879

Table 6. CFA Result of MDSP

Fit Index	FIT CRITERIA		Calculated Values
	Perfect Fit	**Acceptable Fit**	**Calculated Values**
$X^2(p)$	p<0.05		0.013
X^2/sd	$0 \leq X^2/sd \leq 2$	$2 \leq X^2/sd \leq 3$	1,478
AGFI	$0.90 \leq AGFI \leq 1$	$0.85 \leq AGFI \leq 0.90$	0,87
GFI	$0.95 \leq GFI \leq 1$	$0.90 \leq GFI \leq 0.95$	0,912
CFI	$0.95 \leq CFI \leq 1$	$0.90 \leq CFI \leq 0.95$	0.915
RMSEA	$0 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.08$	0.063
RMR	$0 \leq RMR \leq 0.05$	$0.05 \leq RMR \leq 0.08$	0.068

Exploratory Factor Analysis (EFA)

The factor structure of MDSP was reviewed and two factors exceeding eigenvalue 1 were obtained. The two-factor analysis of the scale showed that the eigenvalue for factor 1 was 4.112 and for factor 2 was 1.140. As seen in the table, 8 items were grouped under factor 1 and 4 items under factor 2. The variance percentages of the factors were 34.267% and 9.496%, respectively.

The total variance explained by the factors was found to be 43.764%. The factor loading of item 11 was 0.819 and that of item 4 was 0.482 and the factor loadings of the other items ranged between these values (Table 2).

It was stated in the original of the scale developed by Skisland et al. that it had 3 factors. We found in the present study that it had a 2-factor structure. Factor 1 was called the "Descriptive Dimension" for containing the items expressing more the descriptive content and general attitudes of moral development, and Factor 2 was called the "Nominative Dimension" for containing the items expressing the normative aspects of moral development. Individuals receiving scores between 12 and 27 from the scale will be interpreted to be in the pre-conventional level, those receiving scores between 28 and 44 in the conventional level and those receiving scores between 45 and 60 in the post-conventional level. A review of the Scree Plot Test also showed that the number of factors is 2 (Figure 1).

Internal Consistency

To determine internal consistency a reliability analysis was carried out and a Cronbach's α value was obtained. In this way, we concluded that the scale questions were reliable. Reliability analyses were also performed for the sub-factors to find the reliability of each sub-factor. The Cronbach α values were found to be 0.793 for the Descriptive Dimension, 0.619 for the Normative Dimension and 0.821 for the whole scale. These values showed that the scale had adequate reliability (Table 3).

This table demonstrates that by looking at the Cronbach's α value of an item when it is deleted it can be revealed if that item is needed for the scale. If the α value of an item when it is deleted turns out to be larger than the α value found for the whole scale, then that item should be excluded from the scale. As seen in the Table, no items have to be removed because the α values for all the items are acceptable; that is, none of them has a Cronbach's α value larger than 0.821. By conducting an Item-Total Correlation Analysis, the correlation of each item with the total was explored. The correlation values ranged between 0.470 and 0.705 in the internal consistency analysis. According to these results, there was a highly significant correlation in the positive direction between the total score and item scores (Table 4). The reliability coefficients between the item and total scores of the responses given to the scale administrations made in a period of two weeks were examined. The test-retest (invariance in time) reliability value of the total scale was 0.879 (Table 5).

Confirmatory Factor Analysis (CFA)

A Confirmatory Factor Analysis was carried out to test whether or not the factors of MDSP found through EFA were suitable to the factor structures (Simsek 2007). The relationship of the observed variables, which consisted of Likert-type questions, with the unobserved variables, which are also called factors or latent variables, was measured. It was aimed in this way to reveal to what extent the observed variables explained the latent variables. After constructing a first level CFA model, the tests were performed using the AMOS 22 program. The results obtained in the confirmatory factor analysis are shown in Table 6 and Figure 2.

χ^2/sd Value: This is a test in the structural equation modeling, which is used to find the fitness of the model by covering the entirety of the model. The hypothesis set up for the model is used to decide on the test result. The p value sought is expected to be less than 0.005. A small value means that the model fits better. Sample size is another factor affecting the Chi-square statistic. As the sample becomes bigger, the test value also gets bigger. For this reason, the sample size is taken into consideration when looking at the Chi-square test result. The sample of this study is 22 and its Chi-square test statistic value is 1.487. This shows that there is a perfect fit. Larger values can also be accepted in studies with broader sample size. Another factor affecting the Chi-square statistic is the correlation of observed variables. As the correlation value increases, the Chi-square value also increases.

GFI (Goodness of Fit Index): When this index is 0.95-1, we can construe that there is a perfect fit and when it is 0.90-0.95, an acceptable fit. The GFI calculated in this study was 0.912 and this can be considered as an acceptable fit. *AGFI (Adjusted Goodness of Fit):* This assumes values between 0 and 1. As the value approaches 1, the goodness of fit increases. If it gets a value above 0.85, it means that there is an acceptable fit. It was calculated to be 0.87 in this study. *CFI (Comparative Fit Index:* A value approaching 1 indicates a good fit. It was calculated as 0.915 in this study. *RMSEA (Root Mean Square Error of Approximation):* A value coming closer to 1 indicates a good fit. It is expected to be between 0 and 0.08. If it is between 0 and 0.05, this means a perfect fit and if between 0.05 and 0.08, an acceptable fit. If it is larger than 0.1, that is an indicator of a poor fit. It was calculated as 0.06 in this study. *RMR (Root Mean Square Residual) and SRMR (Standardized Root Mean Square Residual):* When RMR approaches zero, the model being tested is understood to show a better goodness of fit. It was calculated as 0.068 in this study. The standardized version of this index is SRMR (Brown 2003, Thompson 2004, Bartholomew, Knott and Moustaki, 2011, Capik 2014).
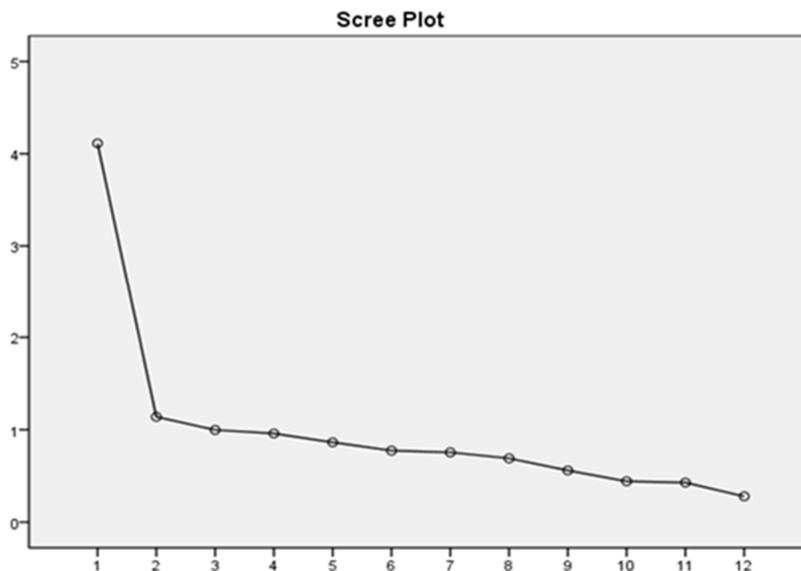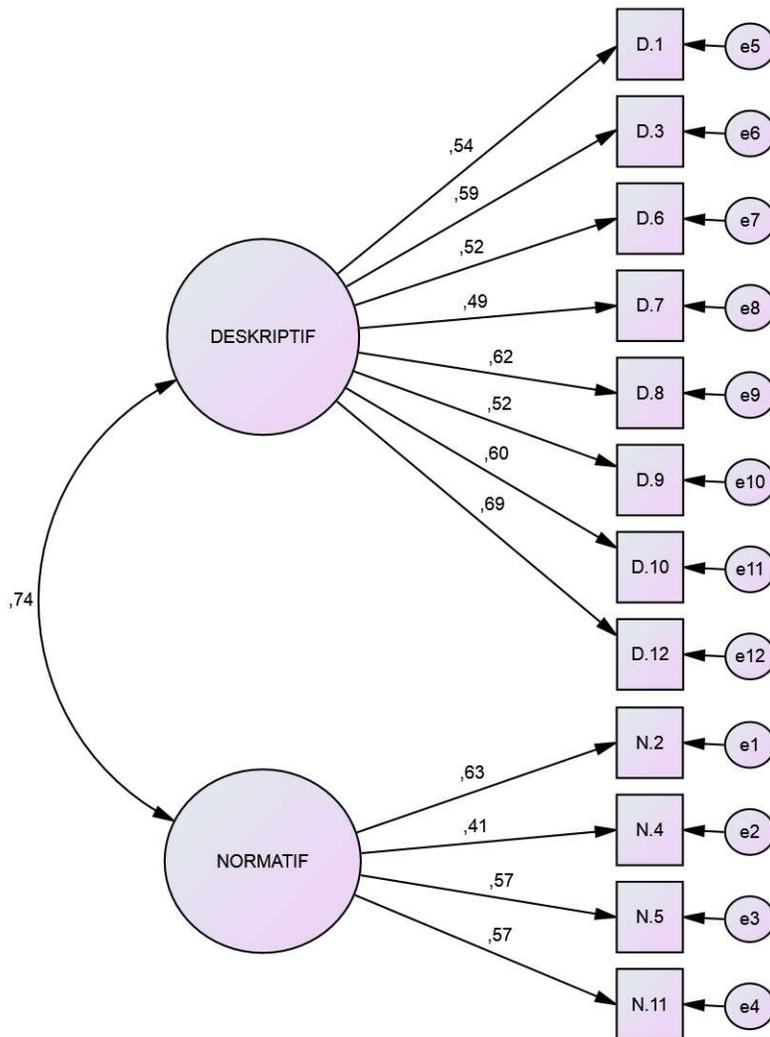

Figure 1. Scree Plot Test

Figure 2: Path Diagram for Confirmatory Factor Analysis

Discussion

MDSP, which is a 12-item Likert-type scale, was translated into Turkish and presented to 11 experts in their fields for their opinion on its content-scope validity. It is stressed that the number of experts whose opinions will be obtained in the testing of validity and reliability should be between 3 and 20 (Tavsancil 2002).

The 3rd item of the scale (Correct behavior consists largely of performing one's social imposed obligations) was first translated as "Correct behavior is to perform one's duties", but upon the experts' proposal it was corrected as "Correct behavior is to largely fulfill the social responsibilities expected from a person". The 8th item of the scale (It makes sense to listen to what most people think is right or wrong) was

translated as "It is necessary to know people's rights or wrongs", but upon the experts' proposal it was corrected as "It is necessary to know what are the rights and wrongs of most people". As a result of evaluations, some arrangements were made in inappropriate statements in line with the proposals of expert persons.

When the scale was back translated later from Turkish to English by a linguist who had a good command of both languages, it was seen that there were no meaning changes in the scale's expressions.

The linguistic validity of the scale was approved in line with the expert opinions obtained. The expressions in the scale were observed to be understandable in the pilot administration of it to a group of nurses.

Another criterion in the testing of validity is construct validity (Erefe 2002, Ozguven 2004, Karasar 2008). A factor analysis was carried out to determine the construct validity of MDSP. The purpose of the factor analysis was to reduce the number of items in the scale to subgroups.

The items measuring the same factor are gathered together to form various groups. The questions in the 12-item Likert-type scale were divided into two groups. Questions 1, 3, 6, 7, 8, 9, 10 and 12 are contained in Group 1 and questions 2, 4, 5 and 11 in Group 2.

It is known in the literature that the items that are present in more than one factor and whose factor loading values differ less than 0.10 and the items whose factor loading is less than 0.30 should be excluded from evaluation (Pop et al. 2011). It is seen in the analyses made that the factor loading of item 4 of the scale was 0.482 and that of item 11 was 0.819 and the factor loadings of the other items ranged between these values. Therefore, none of the items of the scale was excluded from evaluation.

Item analysis relates to the relationship between the value taken by each item in the measurement instrument and the total value obtained in the measurement instrument as a whole. If the items in the measurement instrument have equal loadings and are in the form of independent units, the relationship between the value of each item and the total values is expected to be high.

The scale items where these coefficients are low are considered as not sufficiently reliable. There are various views as to under what level reliability will be considered "insufficient".

Looking at the item-total correlation analysis in this study, the correlation values are seen to range between 0.470 and 0.705. The total score correlation coefficients of the entire items in the scale are above 0.30 and the highest correlation coefficient belongs to item 12 with 0.705. Since there would not be any increase in the Cronbach α reliability coefficient if any item is removed from the scale, no items were excluded from the scale (Akgul 2005). According to these results, there was a highly significant correlation in the positive direction between the total score and item scores.

The test-retest (invariance in time) reliability value of the total scale was found to be 0.879. This figure shows that the reliability between the responses to the two scales administered in different times is at a high level. When the consistency of invariance in time per each item is examined, the correlation values were found to range between 0.619 and 0.803. Accordingly, it was concluded that there was consistency between the responses given by the same persons to each item in different times. The questions showed consistency with respect to time both in the total scale and in the items.

With the factor analysis, the 12 questions of the scale were divided into 2 factors as Descriptive and Normative. Questions 1, 3, 6, 7, 8, 9, 10 and 12 were in the Descriptive factor and questions 2, 4, 5 and 11 were in the Normative factor. These questions were shown as D.1, D.3, D.6, D.7, D.8, D.9, D10, D12 and N.2, N.4, N.5, N.11 during the testing. These variables are called observed variables. According to the results of the confirmatory factor analysis, each observed variable has correlation with the factor (latent variable) it is linked to. There is no correlation between the error terms shown as e1, e2, … e12 and observed values.

The correlation between the latent variables and observed variables is standardized. For this reason, they take values in the interval from 0 to 1. The correlation between the Descriptive and Normative factors is 0.74. The standardized values are a criterion showing how good each item represents the factor it is linked to.

Looking at these values, the item that influences the Descriptive factor most is D.12 with a correlation of 0.69, which reads "For a moral rule to be good, it should be appropriate in all circumstances". The item that influences it least is D.7 with a correlation of 0.49, which reads "Treating authorized bodies respectfully is valuable". The item that influences the Normative factor most is N.2 with a value of 0.63, which reads "Listening to the thoughts of the society on moral issues is important". The item that influences it least is N.4 with a value of 0.41, which reads "The majority is rarely mistaken".

The point to bear in mind is that the correlation of each item with its own factor should be looked at. As can be understood from the figure, the correlation values are between the factors and observed variables. Each observed variable affects the factor it is linked to. Since the correlation value between the scale items, which

are known as observed variables, and the scale errors is 0, there are no loading values.

The Cronbach's α value of MDSP was found to be 0.821. This result shows that the scale is a very highly reliable scale having internal consistency.

Conclusion

As a result of expert opinions and statistical analyses, MDSP was found to have high validity and reliability and it can be used to measure the moral development of professionals in the Turkish society. We can recommend using the Turkish version of the scale in studies assessing moral development in various profession groups.

Relevance to clinical practice

MDSP, which has now been introduced to Turkish literature, will enable assessment of the moral development levels of professionals and can be used as input in planning of interventions for revealing the reasons of the deficiencies arising from ethical and moral problems in healthcare.

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